

ADJUVANT SOLUTIONS

The right tank-mix adjuvant can help maximise success



Vital components or expensive extras? The use of adjuvants dates back to the 70s. But despite their long heritage, adjuvants are sometimes dismissed as “muck and magic” – regardless of the fact that the right adjuvant when used correctly, can be an incredibly beneficial partner in the crop protection programme.

Tank-mix versus built-in adjuvants

As many crop protection products contain some degree of adjuvant system built-in to their formulation, you may be questioning why you should even consider adding a tank-mix adjuvant to your applications. Why would you need more?

Built-in adjuvancy will no doubt help improve the coverage of your spray mix across target plants, but only tank-mix adjuvants can reduce surface water tension on the leaf sufficiently for optimal spreading – because their application rate is based on water volume, whereas pesticides are applied rate/ha.

What's more, tank-mix adjuvants can offer way more than just improved coverage. They can provide a wide variety of benefits from stabilising and mixing your pesticides in the spray tank, to improving the targeting of your spray application and helping it to reach its intended target.

No one adjuvant can perform all the functions to the degree you might need it in every crop, but effective adjuvant components are often combined at different strengths and available in pre-packaged products for specific crop uses. The trick is to select the right adjuvant for the right situation.

Selecting the right adjuvant and getting the best results comes down to a sound understanding of how adjuvants work and what challenges specific types of products can address.

As such, spray adjuvants can largely be divided into two categories – activator adjuvants and special purpose adjuvants – each with different purposes.

Activator adjuvants

Consist of surfactants and oils. Also known as “surface acting agents,” surfactants physically change the properties of the spray solution. They can help a pesticide's ability to emulsify in the tank, and spread and stick on the target. Oils help increase penetration through leaf cuticles and improve spreading across the leaf.

Special Purpose Adjuvants

Buffering agents, compatibility agents and anti-drift agents. Buffering agents are used to lower pH. Compatibility agents are used to help pesticide products and other components in the tank, mix thoroughly together and remain in homogenous solution. Some adjuvants may have a built-in anti-drift aid.

So how can these adjuvant functions help?

Buffering pH stabilises products in the tank

You might not realise it, but many of the crop protection products you will be applying to your fields are susceptible to alkaline hydrolysis – breakdown in high pH water. You could lose up to 50% of your pesticide's efficacy.

Adjuvants that contain a buffering agent lower the pH of the water, preventing alkaline hydrolysis. As most spray water in England is typically alkaline, using an adjuvant that lowers pH to a pre-determined level is a good

idea. This way you can create the pH that is most stable for your spray mixture so it remains stable and active in the spray tank, and can perform to its maximum potential in the field.

As a general rule of thumb, because you will likely be adding numerous products to the spray tank, it is worth keeping spray water around pH6-7 to create the most stable environment for your mixture. This can be achieved using an adjuvant such as Kantor.

Glyphosate however, is most stable at pH5 and therefore will require a specific glyphosate water conditioner such as Volta-Ego that can make the water more acidic.

Emulsifying the mix improves tank-mix compatibility

Adjuvants such as Kantor that contain a compatibility agent, aid emulsification (the mixing of two or more products that are normally immiscible) to help reduce/eliminate physical incompatibility. They help multiple products of a tank-mix to thoroughly mix together and remain thermodynamically stable in the spray tank. With more of your pesticide active ingredients and nutrition in solution, more of it will be absorbed by your target plants in the field, instead of sat in the bottom of your spray tank/blocking nozzles.

Manipulating droplet size optimises coverage

Some adjuvants contain anti-drift agents that help reduce spray drift and keep your spray mix on target. They do this by changing the viscosity of the liquid, which manipulates droplet size. Ultimately, they bind the ultra-small droplets together, reducing the number of fine spray droplets smaller than 100 microns susceptible to drift, and reduce the number of very coarse droplets which are prone to bounce. The result is a droplet with a more uniform spray angle at the nozzle that can hit the target better.

Reducing surface tension increases coverage and retention

Adjuvants which contain surfactants or oils reduce surface tension between the spray liquid and the plant surface, so your spray solution can spread out properly. As explained earlier, this is crucial for coverage and retention to be maximised, on which contact herbicides and protectant fungicides depend. In fact, improving coverage and retention are key requirements for most sprays you will apply if you want better weed and disease control.

Increasing penetration through leaf cuticles improves uptake

As the leaf cuticle is the biggest barrier to crop protection sprays, adjuvants that can improve penetration into the leaf, have a lot to offer.

In fact, many post-emergence herbicides need an adjuvant for optimal uptake – active ingredients with high water solubility struggle to penetrate (waxy) leaf cuticles because oil and water do not mix. Active ingredients with low water solubility – most fungicides – can permeate plant cuticles relatively easily in good conditions, but you can increase entry speed with the right adjuvant.

Increasing herbicide retention in the top 5cm increases residual activity

Residual herbicides typically have a limited lifespan in the soil, and their effectiveness can diminish over time due to factors like degradation or movement. Some adjuvants like Backrow Max can help extend the residual activity of herbicides by reducing their breakdown or enhancing their binding [to soil particles. This prolongs the weed control period, reducing the need for frequent herbicide applications.

How to select the right tank-mix adjuvant

1

Always read the pesticide label. Advice may be given that must be followed on what type of adjuvant to use/avoid.

2

Always buy reputable products produced by a trusted manufacturer. Whilst adjuvant manufacturers may offer many of the same functions, product quality and adjuvant technology varies dramatically. Check there is data and evidence to back up any claims.

3

Using an adjuvant is not always necessary. Think about your target, the pesticides you are applying and what they need to do and weaknesses they have. In good conditions, you may not need an adjuvant and you might therefore not see a benefit. On the other hand, there may be weaknesses in your spray preparation, application and delivery that can be improved.

4

Although different adjuvants can perform a variety of different functions and significantly improve pesticide performance, no one adjuvant can perform every function for every situation. Make sure you have a good knowledge of the adjuvant you are using and it's the right one for the job.

5

Finally, do a small test on your farm. You won't know unless you take the leap to find out.

